

Ventilation Strategies:

Controlling Fresh air

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ASHRAE 62.1 – Required Ventilation

■ Required Ventilation

- Based on occupancy type
- Made up of per person (R_p) and per area (R_a) values
- Example:

$$V_{office} = R_p * P + R_a * ft^2 =$$
$$5 \frac{cfm}{person} * 2 + 100ft^2 * .06 \frac{cfm}{ft^2} = \mathbf{16 cfm}$$

■ Ventilation Effectiveness

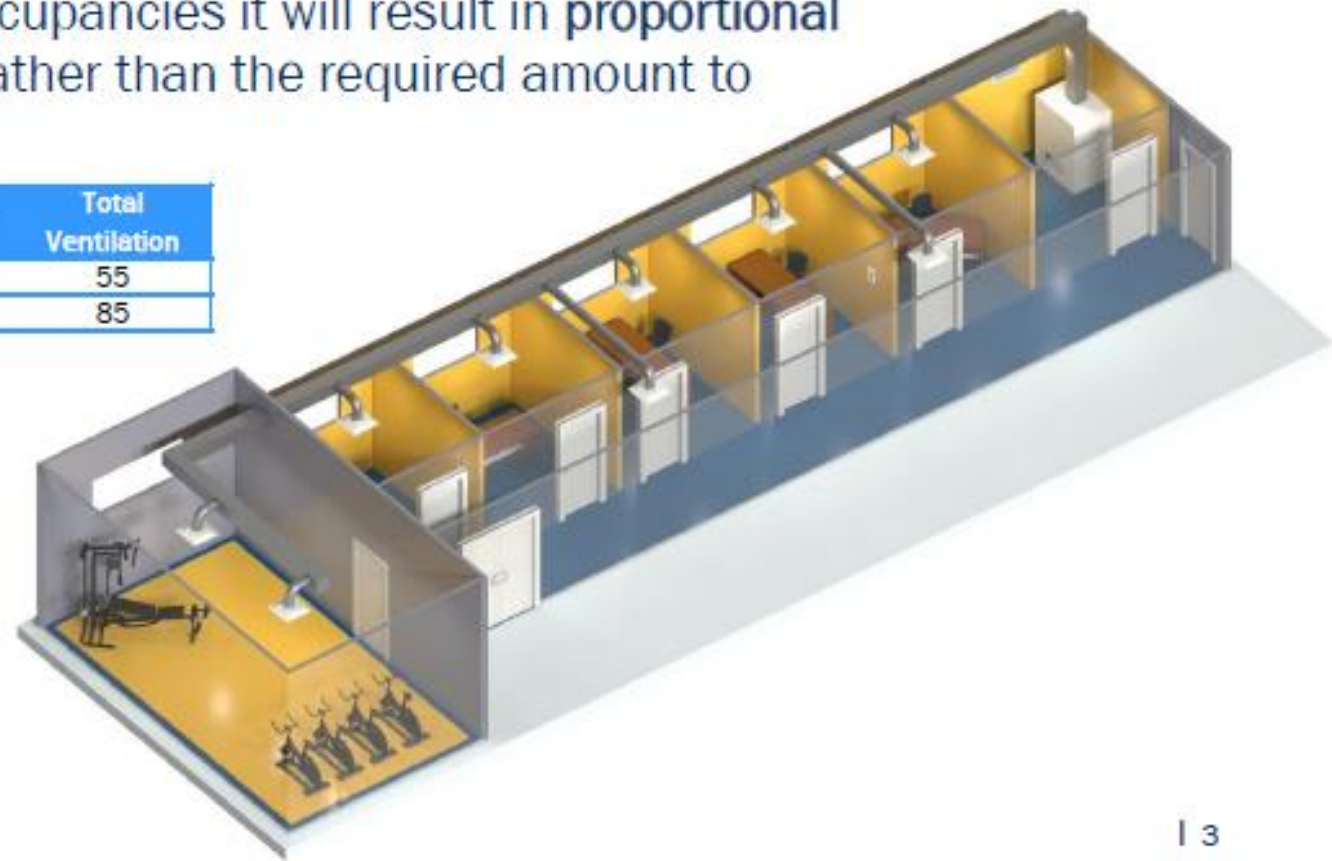
- Air distribution has an affect on how well ventilation arrives in the breathing zone.
- Heating air greater than 15° more than room air delivered from the ceiling requires 25% more ventilation
- Ventilation supplied from the floor can be reduced by 16%

Single Air Handling Unit System

- A single air handling unit or rooftop unit, in many cases, will pull ventilation air into the supply air using the primary fan.
- If the unit is serving a diversity of occupancies it will result in **proportional distribution** throughout the space, rather than the required amount to different occupancies.

Occupancy	Qty.	People/ space	ft ²	Each Space, Ventilation	Total Ventilation
Office	5	1	100	11	55
Gym	1	2	250	85	85

- At 1 cfm/ft office and 1.5 cfm/ft gym there would be a total of 875 CFM. → 16% Ventilation
 - Office → 16 CFM
 - Gym → 60 CFM
 - This wouldn't satisfy the code



Variable Volume Systems

- ASHRAE 62.1 requires the ventilation air to be constant during occupied times
- A Variable Volume System changes the total air flow to the space based on demand
- When the primary fan is responsible for pulling the ventilation air, maintaining constant airflow can be challenging at part load conditions.
 - *Return Air & Ventilation must be controlled with dampers to maintain airflow*
 - *Using an air monitoring damper can help ensure proper ventilation*

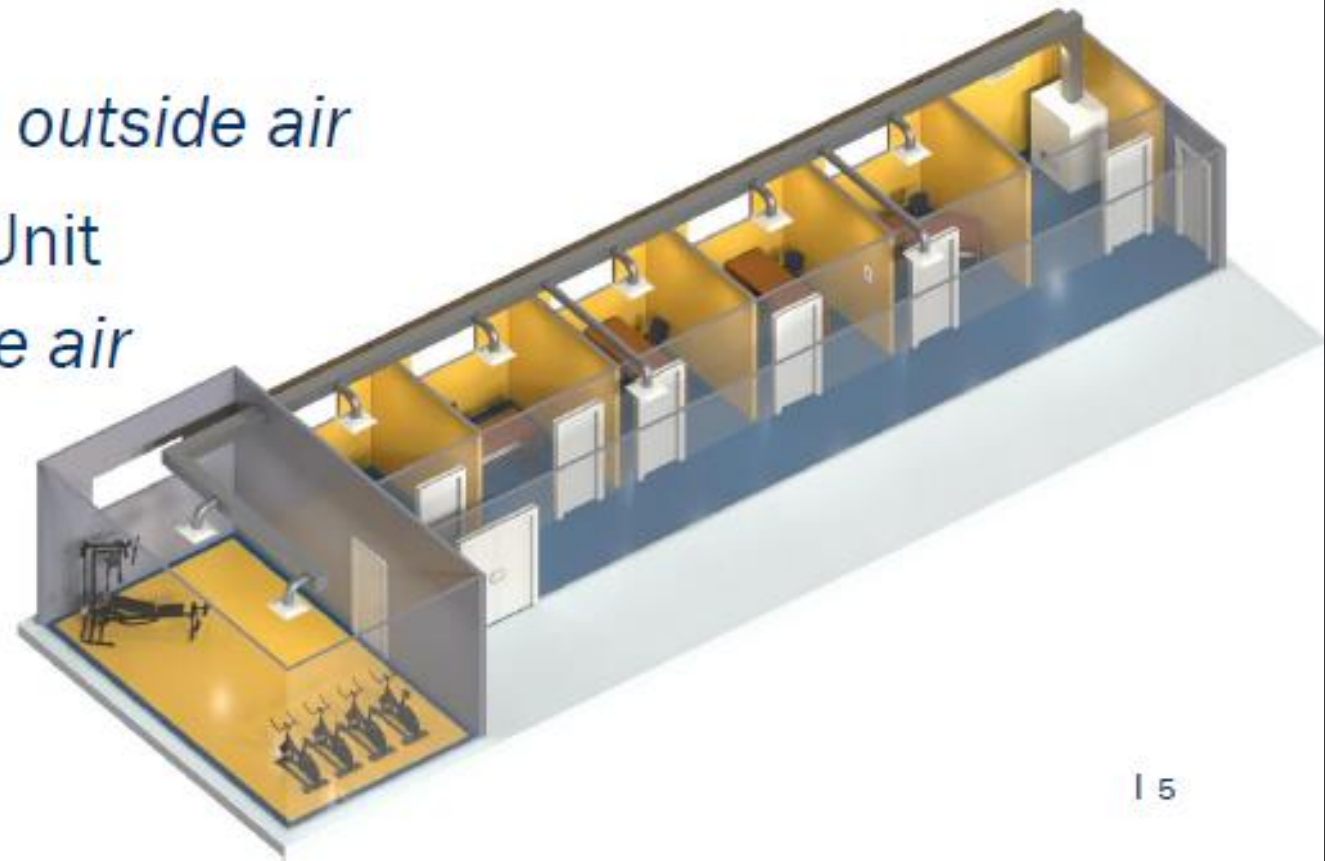


Air Measuring Damper

Dedicated Outside Air Systems (DOAS)

Adding a DOAS to your HVAC system will ensure ventilation remains constant. This can be achieved through the following:

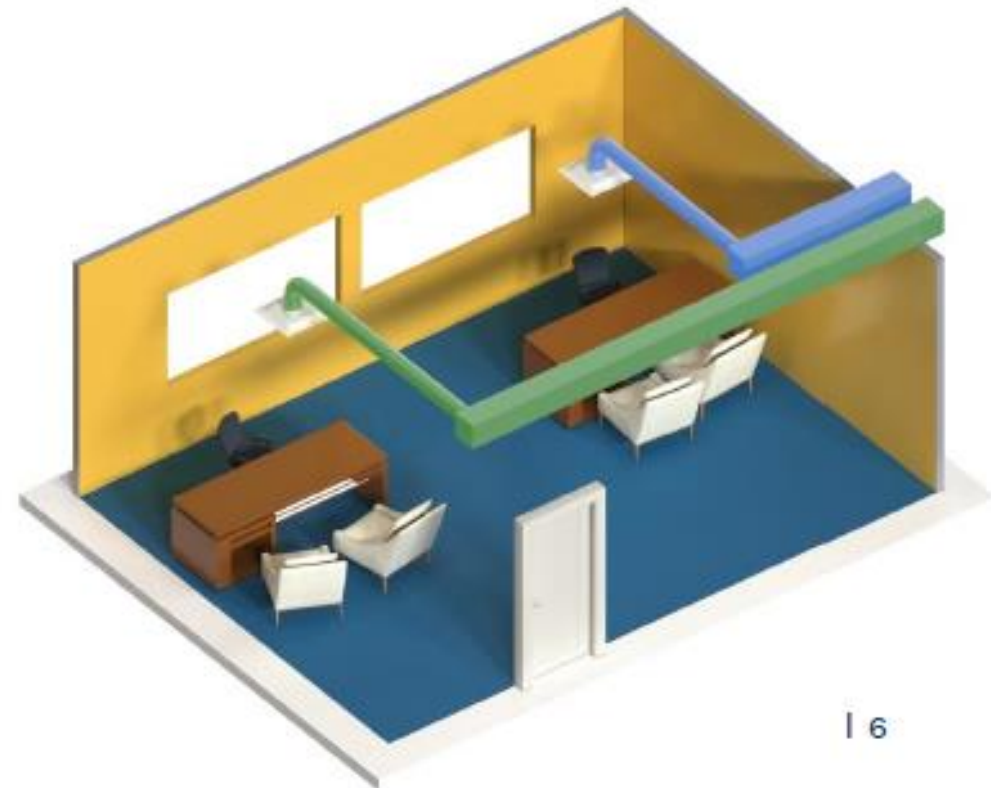
- Dedicated Fan
 - *supplies unconditioned outside air*
- Rooftop Unit/Air Handling Unit
 - *Supplies neutral outside air*
 - *Supplies 55°F air*



DOAS Distribution

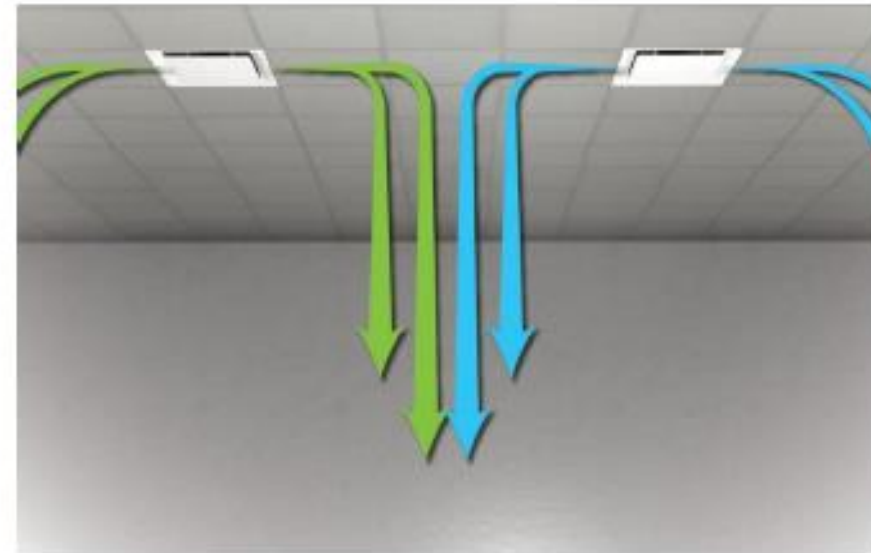
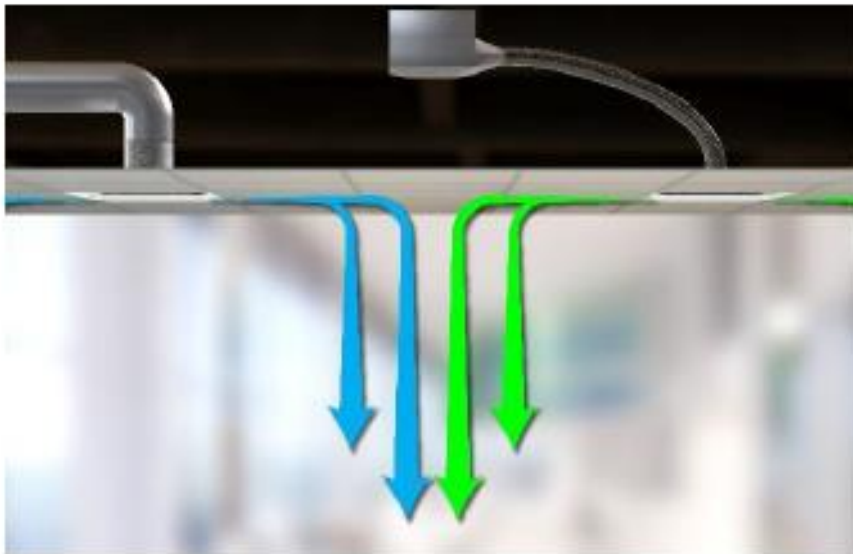
- Through the Building AHU
 - *Solves the constant volume issue, but doesn't solve the diversity of spaces issue*

- Directly to the Space
 - *The DOAS supplies the ventilation separately from the building recirculation AHU*
 - *Allows for better control of the ventilation to individual spaces*
 - *Could cause other issues*



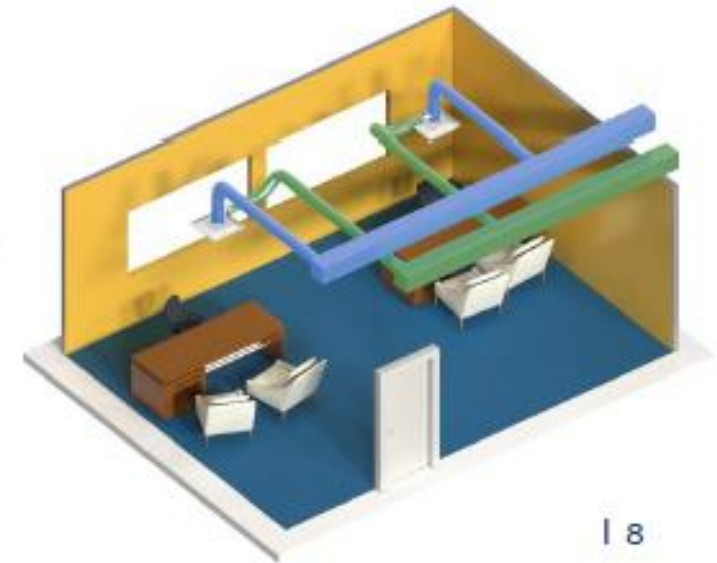
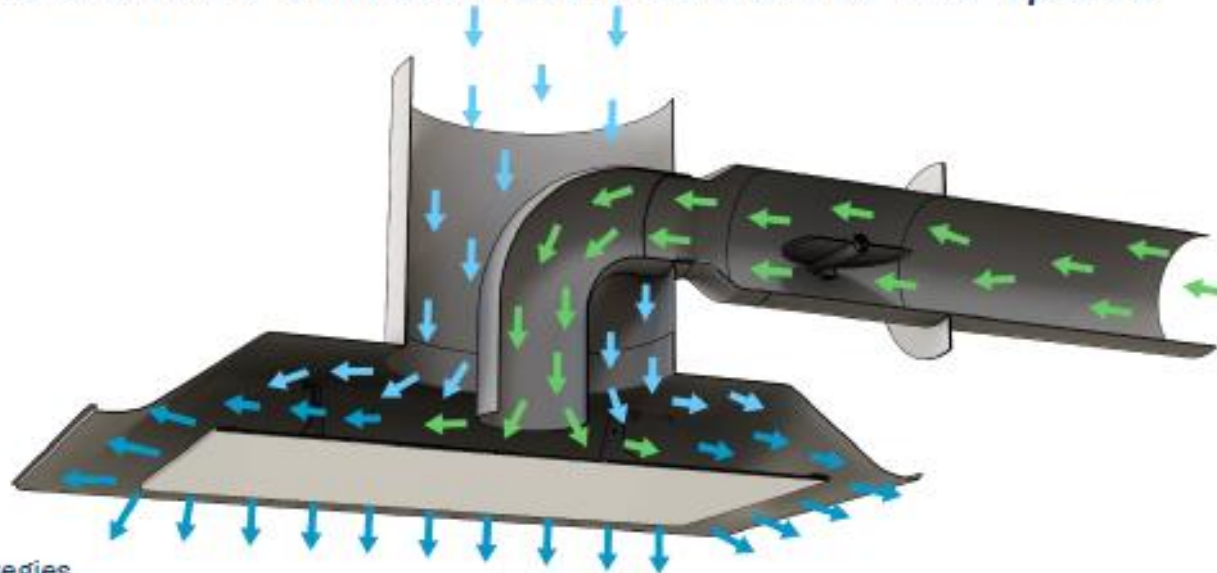
DOAS Distribution: Direct

- Testing has proven that when ventilation is provided separately through another diffuser in the room, the recirculated and ventilation airflows **DO NOT** mix.
- The result is an over conditioned and over ventilated stratification of the room



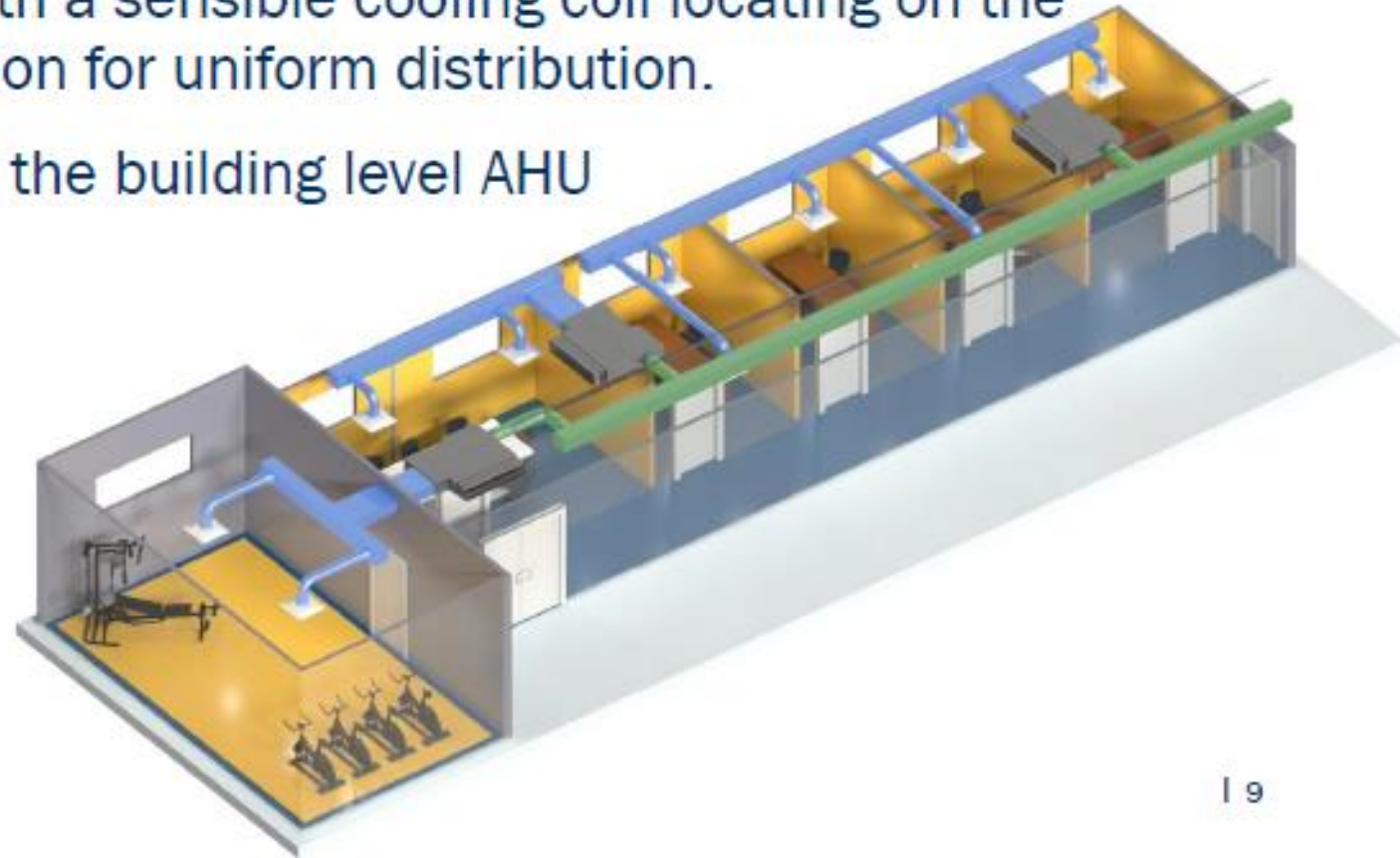
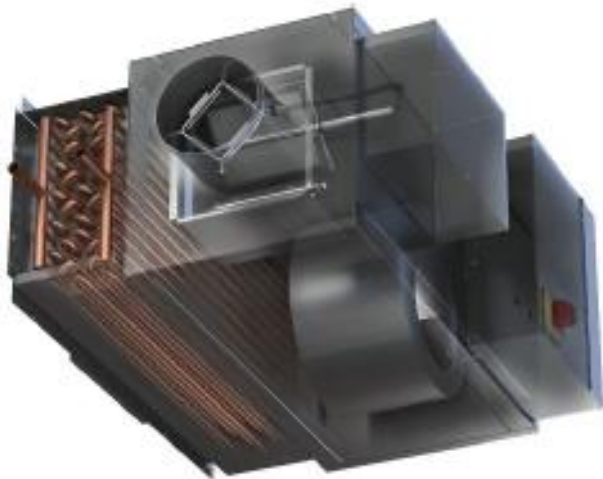
DOAS Distribution: UNI2-DI

- To provide uniform ventilation Nailor has developed the UNI2-DI
- UNI2-DI
 - *Provides a separate inlet for ventilation*
 - *Allows recirculated and ventilation to mix in the diffuser*
 - *Results in Uniform distribution to the space*



DOAS Distribution: Terminal Unit

- The Nailor 33SZ Chilled Water Fan Powered Terminal Unit brings ventilation control down to the zone level.
- Recirculated air is cooled with a sensible cooling coil locating on the unit and mixed with ventilation for uniform distribution.
- This eliminates the need for the building level AHU



Contact the Experts

- Learn more about Nailor Industries, Inc. entire air handling/ air distribution line by going to <http://www.technicalair.com/nailor>
- Contact the Technical Air Systems' Sales Engineering Team at **973-285-0333** or by email at solutions@technicalair.com
- Check out more Air Handling & Air Distribution articles along with Building Control & Performance and Commercial Kitchen articles at [Technical Air Systems' Engineering Corner!](#)

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